

REMARKS

Claims 1-13, now amended, are again presented for examination. Support for the amendments of the claims is found, *inter alia*, at page 3, line 18, to page 4, line 11. No change in scope of these claims is either intended or believed to be effected by these changes.

Claims 1, 2, 3 and 5-8 are the only independent claims.

The Office Action indicated that Claims 2, 3 and 5-8 would be allowable if rewritten in independent form including all of the limitations of Claim 1. Since the latter claims have been so rewritten with no change in scope, they are now believed to be in condition for allowance.

The Office Action objected to Figures 3 and 33 for reasons set out in sections 2 and 3 of the Office Action. In response to the objection to Figure 3, A Request for Approval of Drawing Changes is submitted herewith. In response to the objection to Figure 33, Applicant has amended the specification to overcome the noted objection. It is believed that the objections to those figures have been remedied, and their withdrawal is therefore respectfully requested.

Claims 1, 9 and 10 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,188,094 B1 (Kochi et al.).

Applicant respectfully traverses the rejection of Claims 1, 9 and 10 because *Kochi et al.* does not teach all the claim limitations of Applicant's present invention.

Claim 1, as amended, is directed to a solid-state image pickup device with at least one unit cell having a photoelectric converter which generates a signal, an

amplifier for the signal generated in the photoelectric converter, a transferor for transferring the signal to the amplifier, a resettor for resetting an input terminal of the amplifier, and a selector for selecting the amplifier and outputting an amplified signal to a signal output line. Claim 1 further recites that one common line performing at least two different functions of a selection control line for controlling the selector, a transfer control line for controlling the transferor, a reset control line for controlling the resettor, and the signal output line in a unit cell, or between two unit cells operating in time series fashion, or between two adjoining unit cells.

An advantage of a device constructed according to Claim 1 is that one common line will perform the functions of more than one control line, thus reducing the number of lines in a solid-state image pickup device, and thereby expanding design possibilities and improving manufacturing yield as related to wiring (see page 10, lines 14-19).

*Kochi et al.* relates to a solid-state image pickup device having photoelectric conversion elements formed on a semiconductor substrate between the neighboring conversion elements via an interlayer layer (see col. 2, lines 13-23).

The Examiner rejected Claim 1 based on the assertion that Figure 7 of *Kochi et al.* discloses all the elements of Claim 1. However, *Kochi et al.* does not teach that one common line will have the functions of more than one control line as recited in Claim 1, and thus the present invention is not anticipated by *Kochi et al.* Referring to Figure 7,  $\phi_{SEL}(n+1)$  is a single line which is assigned only a single function of a selection control line of adjacent pixels. Stated differently, *Kochi et al.* requires a control line for

each function, thereby failing to consolidate different functions on a single wiring. In contrast, however, Applicant's present invention consolidates different functions on a single wiring, thereby reducing both the number of wirings and the area occupied by those wirings. Therefore, in order to clarify this distinction between *Kochi et al.* and Applicant's present invention, independent Claim 1 has been amended. Accordingly, Claim 1 is patentable over *Kochi et al.*, and is in condition for allowance.

Claims 11-13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Kochi et al.*

Applicant traverses the rejection. Applicant has found nothing in *Kochi et al.* that teaches or suggests consolidating different functions on a single wiring. Accordingly, Claims 11-13 are patentable over *Kochi et al.*

Claim 4 was rejected under 35 U.S.C. § 103(a) as being unpatentable over *Kochi et al.* in view of U.S. Patent No. 6,054,704 (Pritchard et al.).

*Pritchard et al.* relates to CMOS storage pixel sensors for still cameras and to methods for operating those sensors (see col. 1, lines 8-10). *Pritchard et al.* discloses connecting the transfer control signal line XFR 24 and the supply voltage line Vcc 28 (see Figure 1; col. 2, lines 47-53; col. 5, lines 45-49).

The Office Action at section 5 states that "*Kochi et al.* does not seem to specifically disclose the transfer control line and the selection control line as the common line." The Examiner cites *Pritchard et al.* as remedying that deficiency of *Kochi et al.* by "... teaching a transfer and selection control line as the common line." Actually, *Pritchard et al.* discloses connecting a transfer control line and a supply voltage line, not a

selection control line. Note that transistor 30 which is connected to the selection line 34 actually functions as the selection control. Thus, Vcc cannot be the selection control line. Applicant has found nothing in *Pritchard* that remedies the deficiency. Accordingly, nothing in *Kochi et al.* or *Pritchard et al.* teaches or suggests all the elements of Claim 4, and, therefore, Claim 4 is patentable over *Kochi et al.* in view of *Pritchard et al.*

A review of the other art of record has failed to reveal anything which, in Applicant's opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.

The dependent claims in this application depend from Claim 1 discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable reconsideration and early passage to issue of the present application.

Applicant's undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



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Attorney for Applicant

Registration No. 24613

FITZPATRICK, CELLA, HARPER & SCINTO  
30 Rockefeller Plaza  
New York, New York 10112-3801  
Facsimile: (212) 218-2200

VERSION OF SPECIFICATION MARKED TO SHOW CHANGES MADE THERETO

--FIG. 33 is a schematic sectional showing an example of such a unit cell, in which a photodiode, a transfer means, and a reset means are shown. Reference numeral 81 denotes a p-type well, reference numeral 82 [does] denotes an oxide film as an element-separating region, reference numeral 83 [does] denotes a cathode of a photodiode, reference numerals 84 and 85 [do] denote respectively a drain and a source of an n-channel MOS transistor as a reset means, and the drain 84 is connected to the input terminal of the amplifying means and the source 85 is connected to the power line for resetting. Reference numerals 86 and 87 denote gate electrodes. Although not shown, n-channel MOS as an amplifying means and a selecting means are likewise built in the p-type well 81. Thus, each element configuring a unit cell comprises the same conductivity type element with electrons being used as transmission carriers. Reference numeral 88 denotes a [P] p-type layer. With the conductivity type being made opposite in FIG. 33, elements using holes as transmission carriers can be used for configuration.--

VERSION OF CLAIMS MARKED TO SHOW CHANGES MADE THERETO

1. (Amended) A solid-state image pickup device comprising at least one unit cell having a photoelectric conversion portion which generates a signal, an amplifying means for amplifying [a] the signal generated in the photoelectric conversion portion, a transfer means for transferring the signal to the amplifying means, a reset means for resetting an input terminal of the amplifying means, and a selecting means for selecting the amplifying means and outputting [a] an amplified signal to a signal output line,

wherein one common line performs at least two different functions of a selection control line for controlling the selecting means, a transfer control line for controlling the transfer means, a reset control line for controlling the reset means, and [the] a signal output line in a unit cell, or between two unit cells operating in time series fashion, or between two adjoining unit cells[ are one common line].

2. (Amended) [The solid image pickup device according to claim 1,]  
A solid-state image pickup device comprising at least one unit cell having a photoelectric conversion portion which generates a signal, an amplifying means for amplifying the signal generated in the photoelectric conversion portion, a transfer means for transferring the signal to the amplifying means, a reset means for resetting an input terminal of the amplifying means, and a selecting means for selecting the amplifying means and outputting an amplified signal to a signal output line,

wherein [the] one common line performs the different functions of a  
[the] reset control line for controlling the reset means and [the] a signal output line in a  
unit cell, or between two unit cells operating in time series fashion, or between two  
adjoining unit cells[ are the common line].

3. (Amended) [The solid image pickup device according to claim 1,]  
A solid-state image pickup device comprising at least one unit cell having a photoelectric  
conversion portion which generates a signal, an amplifying means for amplifying the  
signal generated in the photoelectric conversion portion, a transfer means for transferring  
the signal to the amplifying means, a reset means for resetting an input terminal of the  
amplifying means, and a selecting means for selecting the amplifying means and  
outputting an amplified signal to a signal output line,

wherein [the] one common line performs the different functions of a  
[the] transfer control line for controlling the transfer means and [the] a signal output line in  
a unit cell, or between two unit cells operating in time series fashion, or between two  
adjoining unit cells[ are the common line].

4. (Amended) The solid-state image pickup device according to  
claim 1, wherein one common line performs the different functions of the transfer control  
line and the selection control line[ are the common line].

5. (Amended) [The solid image pickup device according to claim 1,]

A solid-state image pickup device comprising at least one unit cell having a photoelectric conversion portion which generates a signal, an amplifying means for amplifying the signal generated in the photoelectric conversion portion, a transfer means for transferring the signal to the amplifying means, a reset means for resetting an input terminal of the amplifying means, and a selecting means for selecting the amplifying means and outputting an amplified signal to a signal output line,

wherein [the] one common line performs the different functions of a [the] transfer control line for controlling the transfer means and [the] a reset control line for controlling the reset means in a unit cell, or between two unit cells operating in time series fashion, or between two adjoining unit cells[ are the common line].

6. (Amended) [The solid image pickup device according to claim 1,] A

A solid-state image pickup device comprising at least one unit cell having a photoelectric conversion portion which generates a signal, an amplifying means for amplifying the signal generated in the photoelectric conversion portion, a transfer means for transferring the signal to the amplifying means, a reset means for resetting an input terminal of the amplifying means, and a selecting means for selecting the amplifying means and outputting an amplified signal to a signal output line,

wherein [the] one common line performs the different functions of a [the] selection control line for controlling the selection means and [the] a reset control line

for controlling the reset means in a unit cell, or between two unit cells operating in time series fashion, or between two adjoining unit cells[ are the common line].

7. (Amended) [The solid image pickup device according to claim 1,] A solid-state image pickup device comprising at least one unit cell having a photoelectric conversion portion which generates a signal, an amplifying means for amplifying the signal generated in the photoelectric conversion portion, a transfer means for transferring the signal to the amplifying means, a reset means for resetting an input terminal of the amplifying means, and a selecting means for selecting the amplifying means and outputting an amplified signal to a signal output line,

wherein [the] a first common line performs the different functions of a [the] reset control line for controlling the reset means and [the] a signal output line in a unit cell, or between two unit cells operating in time series fashion, or between two adjoining unit cells [are a first common line], and [the] a second common line performs the different functions of a [the] transfer control line for controlling the transfer means and [the] a selection control line for controlling the selection means in a unit cell, or between two unit cells operating in time series fashion, or between two adjoining unit cells[ are a second common line].

8. (Amended) [The solid image pickup device according to claim 1,] A solid-state image pickup device comprising at least one unit cell having a photoelectric

conversion portion which generates a signal, an amplifying means for amplifying the signal generated in the photoelectric conversion portion, a transfer means for transferring the signal to the amplifying means, a reset means for resetting an input terminal of the amplifying means, and a selecting means for selecting the amplifying means and outputting an amplified signal to a signal output line,

wherein [the] one common line performs the different functions of a [the] reset control line for controlling the reset means and [the] a signal output line in a unit cell, or between two unit cells operating in time series fashion, or between two adjoining unit cells[ are the common line], and the one common line is provided with a switch for providing an ON-state voltage sufficient to turn on the reset means.

9. (Amended) The solid-state image pickup device according to claim 1, wherein during a period in which the selecting means are turned on, a noise signal and an optical signal are read out from the signal output line.

10. (Amended) The solid-state image pickup device according to claim 1, wherein the unit cells are arranged in a two-dimensional matrix.

11. (Amended) The solid-state image pickup device according to claim 1, wherein the unit cells are arranged in a two-dimensional matrix and a power line is disposed between two adjoining unit cells.

12. (Amended) An image pickup system comprising the solid-state image pickup device according to any one of claims 1 to 11, an optical system for optically forming an image onto the solid-state image pickup device, and a signal processing circuit for processing an output signal from the solid-state image pickup device.

13. (Amended) The solid-state image pickup device according to claim 1, wherein the photoelectric conversion portion, the amplifying means, the transfer means, the reset means, and the selecting means are all elements of the same conductivity type.